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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

NGUYEN, VU ANH

ART UNIT

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4171

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/565,555	<b>Applicant(s)</b> HAYASHI ET AL.	
	<b>Examiner</b> Vu Nguyen	<b>Art Unit</b> 4171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/14/2006, 01/23/2006</u> .                                  | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 3-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Doi et al. (U.S. 6,620,229).

3. Regarding the instant application, claim 1 recites an aqueous ink comprising a dispersant, a colorant, and an aqueous medium, wherein the dispersant is a crosslinked copolymer containing a crosslinkable monomer (A), an aromatic group-containing monomer (B), and an ionic monomer (C). The crosslinkable monomer includes various dimethacrylates and the ionic monomer includes (meth)acrylic acid. Doi et al. teach a water-based ink composition comprising a dispersant, a colorant, and an aqueous medium. The dispersant is disclosed as a copolymer comprising a hydrophobic group and a hydrophilic group, including an ABC-type block copolymer. Attention is drawn to a specific example of styrene-alkylmethacrylate ester-methacrylic acid copolymer (col. 5, lines 60-61).

4. Claims 3 and 4, which depend on either claim 1 or 2, specify the C component to be anionic or cationic, respectively. The dispersant further contains anionic or cationic functional group (col. 5, lines 29-64, and line 67).

Art Unit: 4171

5. Claim 5, which depends on either claim 1, 2, 3, or 4, recites a dispersant to colorant mass ratio of 1:1 to 1:30. Doi et al. also teach a dispersant to colorant mass ratio of 1:1 to 1:30 (equivalently, 50- 3%, col. 6, line 60).

6. Claims 6 and 7, which depend on claim 1, specify the colorant to be a pigment and carbon black, respectively. The colorant in Doi et al. is also disclosed as a pigment and black carbon (col. 2, lines 60-65).

7. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Harz et al. (U.S. 7,285,592).

8. Regarding claim 1, Harz et al. disclose a colorant preparation for inkjet inks wherein the preparation comprises a polymeric dispersant, a pigment, and an aqueous medium. The dispersant, referred therein as an acrylate resin, is disclosed as a copolymer comprising a monoalkenyl aromatics (including styrene), an acrylate (including (meth)acrylic acid) (col. 2, lines 2-5), and a "surface-active compound capable of polymerization" (i.e., a crosslinkable monomer) (col. 3, lines 1-4). Examiner notes that since Harz et al. teach a dispersant that contains (meth)acrylic acid and since it is further disclosed that "[t]he acrylate resin is advantageously used in alkaline aqueous solution or ammoniacal solution" (col. 2, lines 62-63), it is inherent that the dispersant is ionic. Specifically, it is expected to be anionic. (See also paragraph 10 below).

9. Claim 2 narrows the copolymer of claim 1 to one with a weight-average molecular weight of 1,000-100,000, containing 0.01-5 mol% of the crosslinkable A, 30-

Art Unit: 4171

90 mol% of the aromatic B, and 5-65 mol% of the ionic C. The copolymer disclosed by Harz et al. is composed of 50-80 mol% of monoalkenyl aromatics (including styrene), 20-50 mol% of acrylates (including (meth)acrylic acid) (col. 2, lines 2-5), and 0.5-2 mol% of a "surface-active compound capable of polymerization" (col. 3, lines 1-4). Also disclosed is the weight-average molecular weight of the copolymer, which is 1,000-50,000 (col. 2, lines 2-5).

10. Claim 3 specifies the ionic monomer to be an anionic monomer. The applicants describe anionic monomers as inclusive of unsaturated carboxylic acids such as acrylic acid and methacrylic acid (page 6, last paragraph). The dispersant disclosed by Harz et al. also includes acrylic acid and methacrylic acid (col. 2, line 19).

11. Regarding claim 5, Harz et al. teach a dispersant-to-pigment weight ratio in the range of 1:1 to 1:20 (col. 4, lines 1-20).

12. Regarding claims 6-7, Harz et al. disclose the use of pigments, including carbon black (col. 3, line 55).

### ***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 4171

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (U.S. 6,245,832), in view of Fujimoto et al. (U.S. 6,620,887) and Anton et al. (U.S. 6,020,400).

16. Regarding claims 1 and 3, Suzuki et al. teach an ink comprising an aqueous medium, a pigment, and a dispersant, wherein the dispersant is a copolymer comprising a hydrophilic moiety and a hydrophobic moiety (abstract). The hydrophilic monomer includes (meth)acrylic acid and anhydride, and the hydrophobic monomer includes styrene and its derivatives (col. 3, lines 21-49). The examiner notes that the applicants employ (meth)acrylic acid as an anionic monomer, and since Suzuki et al. also use (meth)acrylic acid as a hydrophilic monomer, the anionic nature of the dispersing polymer is therefore implied. However, Suzuki et al. fail to teach of a crosslinkable monomer and of the ionicity of the dispersing polymer.

Regarding the crosslinkable monomer, Fujimoto et al. teach crosslinked fine particles obtained by "polymerizing a compound (a<sub>1</sub>) having one or two radical-polymerizable ethylenic unsaturated groups in the molecule and a compound (a<sub>2</sub>) having three or more (meth)acryloyl groups in the molecule" (col. 3, lines 31-35).

Art Unit: 4171

Fujimoto et al. also teach that "[t]he use of the crosslinked fine particles...enabled the same extent of shrinkage reduction with less viscosity increase compared to cases in which a conventional polymer or oligomer was incorporated" (col. 3, lines 48-52).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to include a crosslinkable monomer taught by Fujimoto et al. to the dispersing copolymer taught by Suzuki et al. to develop the presently claimed copolymer in light of the pigment-dispersion improvements taught by Fujimoto et al.

17. Regarding claim 2, the dispersant disclosed by Suzuki et al. has a weight-average molecular weight of 3,000-15,000 (col. 4, line 16), and is obtained by copolymerizing 40-80 mol% hydrophilic monomer and 20-60 mol% hydrophobic monomer (col. 3, lines 7-13). The hydrophilic monomer comprises of ionic monomer as explained above. The disclosure fails to include a crosslinkable monomer and its percentage in the polymer composition.

Fujimoto et al. teach that the amount of the crosslinkable component ( $a_2$ ) should be in the range of 5-45 wt% of the ( $a_1 + a_2$ ) total amount (col. 6, lines 2-4) for the same reason mentioned above. It is to be noted that this range overlaps the range for which protection is being sought by the applicants.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to include a crosslinkable monomer taught by Fujimoto et al. to the dispersing copolymer taught by Suzuki et al. to develop a dispersing copolymer with the composition and molecular weight as presently claimed by the applicants for improving pigment dispersion as taught by Fujimoto et al.

Art Unit: 4171

18. Regarding claim 4, Suzuki et al. fail to teach a cationic monomer as a constituting component of the dispersing polymer.

Anton et al. teach of an ABC-typed block copolymer having hydrophilic and hydrophobic groups for dispersing pigments and that the polymer may be non-ionic, anionic, or cationic (col. 3, lines 60-65). In other words, the dispersant contains a substituent which comes from a cationic monomer. The disclosure by Anton et al. clearly implies that cationic and anionic dispersing polymers are functionally equivalent with respect to dispersing pigments in aqueous medium.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the composition of the dispersant taught by Suzuki et al. to have the option of including a cationic monomer as a hydrophilic monomer in light of the teachings by Anton et al.

19. Regarding claim 5, the disclosure by Suzuki et al. reveals implicitly and by way of example a dispersant-to-pigment mass ratio within the range of 1:1 to 1:30 (col. 11, lines 56-67, col. 12, lines 1-2).

20. Regarding claims 6 and 7, Suzuki et al. teach the use of pigment as the colorant for the disclosed ink (abstract), including carbon black (claim 2).

### ***Claim Rejections - 35 USC § 112***

21. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.



22. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites “[a]n aqueous ink comprising a dispersant, a colorant, and an aqueous medium, wherein the dispersant is a crosslinked copolymer containing (A) a crosslinkable monomer, (B) an aromatic group-containing monomer, and (C) an ionic monomer as essential components” and claims 2-7 depend on claim 1.

The phrase “a crosslinked copolymer containing (A) a crosslinkable monomer” is not clear as to whether the cross-linking reaction be executed during the synthesis of the polymer or after and separate from it. Although the disclosure points to the former process, the claim language clearly implies the latter process.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vu Nguyen whose telephone number is (571)270-5454. The examiner can normally be reached on M-F 7:30-5:00 (Alternating Fridays).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 4171

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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